ST. JOHNS BAYOU PROJECT

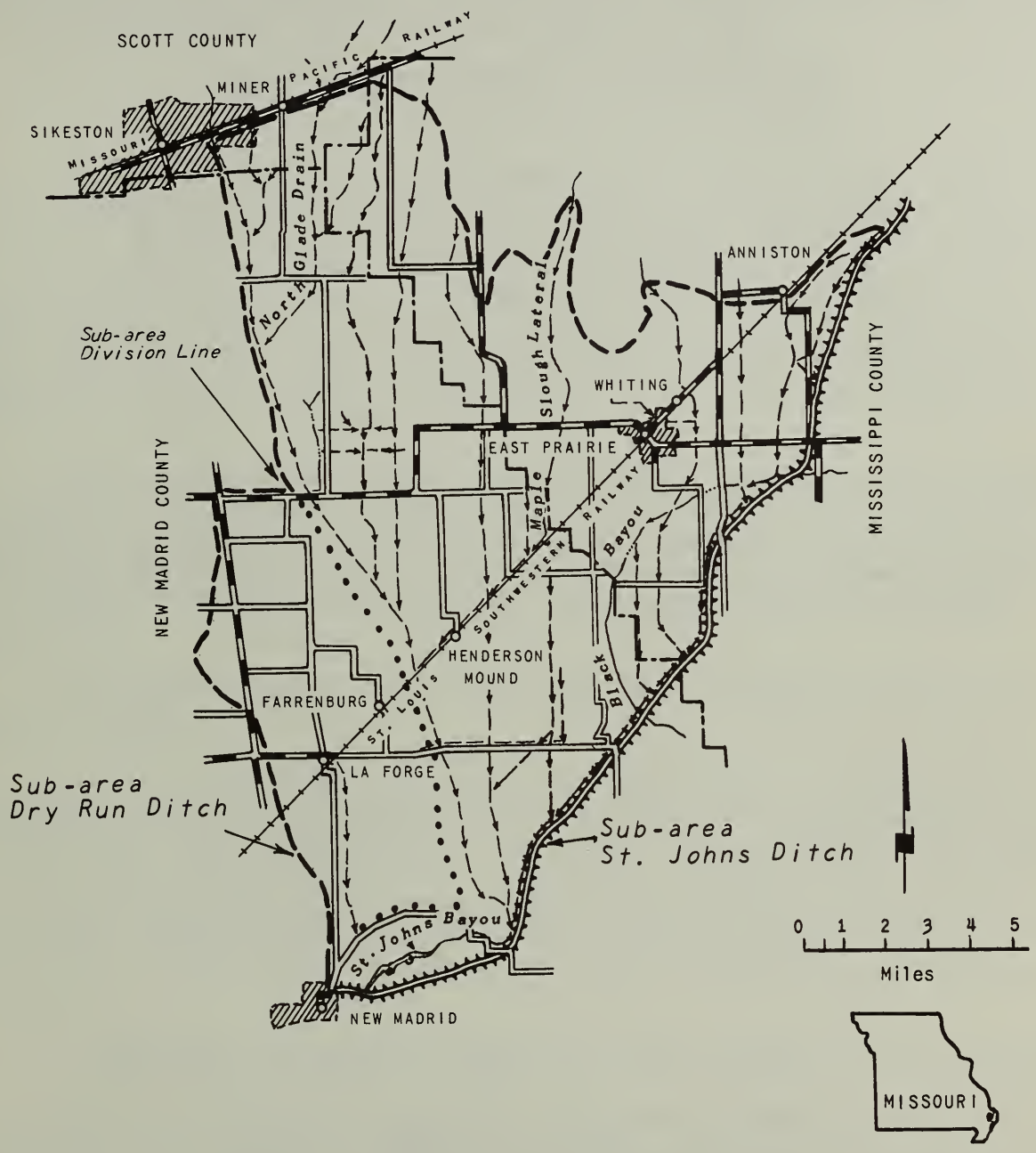
(MISSOURI)

MISSISSIPPI RIVER AND TRIBUTARIES PROJECT REVIEW

REPORT ON PRESENT AND ANTICIPATED AGRICULTURAL CONDITIONS

Prepared by the
U. S. Department of Agriculture for the Mississippi River Commission

Soil Conservation Service
Columbia, Missouri
December, 1957



ST. JOHNS BAYOU PROJECT

IN MISSISSIPPI, NEW MADRID AND SCOTT COUNTIES, MISSOURI

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
COLUMBIA, MISSOURI

REFERENCE

CARTOGRAPHIC APPROVAL TECHNICAL APPROVAL

COMPILED	TRACED	CHECKED	DATE
	J. E. L.	G. L. B.	3-7-57

Revised 8-26-57
4-L-11,310

USDA-SCS-FORT WORTH TEX 1957

AUTHORITY

This report has been prepared by the Soil Conservation Service, U. S. Department of Agriculture, covering studies made under authority of Section 6, Public Law 566, 83rd Congress, as amended, and upon request of the Mississippi River Commission. The basis for study was agreed upon as set forth in the Project Study Statement dated July 1957.

AGENCY PARTICIPATION AND RESPONSIBILITIES

Material contained herein is based upon the data at hand and the combined judgment of agricultural technicians most familiar with the project area and its agricultural conditions and problems. Under a U. S. Department of Agriculture Memorandum of Understanding, consummated February 2, 1956, the U. S. Forest Service, the Agricultural Research Service and the Soil Conservation Service have each participated in the study. From time to time assistance from other persons, such as, representatives of the Agricultural Extension Service, State College of Agriculture and Experiment Stations, and other agencies, has been given.

The Agricultural Research Service has been responsible for furnishing field crop and livestock commodity price data, field crop and livestock enterprise production cost data, and interest rates for capitalization, amortization and discounting; it has assisted the Soil Conservation Service in studies of field crop and pasture yields and in over-all economic procedures.

All woodland yields, values and costs were developed by the U. S. Forest Service.

The Soil Conservation Service through the office of the Missouri State Conservationist has, in general, been responsible for coordinating and conducting the study and preparing this report. It has classified the soils of the area, in accordance with a legend used throughout the Mississippi River and Tributaries study area. In accordance with the major soil groupings, it has estimated land use and cropping patterns, extent and cost of land use conversions, and extent and cost of farm and group drainage systems.

METHOD OF COMPUTING AGRICULTURAL VALUES CREDITABLE TO THE PROJECT

Data presented in this report are intended to portray three different situations with respect to land use, cropping patterns, crop yield, etc: (1) the current situation, (2) the future situation without the proposed project, and (3) future conditions with the proposed project. The basis for computing agricultural benefits in this report is the difference in crop values between the second and third situations listed. The major reason for this type of calculation is that it provides a systematic means of excluding non-project influences which are expected whether a project is constructed or not. Because of current land development operations and expected changes in commodity price and price-cost relationships, for example, future land use and cropping systems without the project, may be quite different than the present. This difference is not credited to the project.

LIMITS OF APPLICATION OF ESTIMATES

The estimates cover an appraisal of the agricultural values and costs that can be expected as a result of agricultural drainage in association with installation of the proposed project works. However, the data include no estimates of flood damage reduction values or costs, though the land use and cropping pattern estimates reflect the flood protection that would be afforded by the proposed project works. Average flood-free yield estimates have been used throughout the study so that they can be used as a basis for calculation of flood damage reduction by the Corps of Engineers, based upon its own hydrologic studies.

The Department of Agriculture, having made no hydrologic studies of its own in the area, has developed estimates on the basis of the hydrologic data furnished by the Corps of Engineers, including the delineation of limits of project effectiveness, maximum overflow, and other zone lines that established the conditions for the project study. All soils of such characteristics as to not require drainage have been eliminated from drainage evaluations. However, no attempt has been made by the Department of Agriculture to designate areas, within the limits of project effectiveness furnished by the Crops, which, because of elevation might be drained without the project and hence not properly credited to the project. Further engineering studies by the Corps may reveal the desirability of eliminating some acreages of that type from the computations contained herein. The Department of Agriculture does not have responsibility for that phase of the study.

DESCRIPTION OF PROJECT

The St. Johns Bayou project consists of a pumping plant at the St. Johns Bayou floodgate in New Madrid County and improvement of St. Johns main ditch from the floodgate upstream to the St. Louis - Southwestern Railroad crossing. The purpose of these project features is to reduce the extent of flooding of the project area and to provide major drainage outlets.

The project is divided into two sub-projects: St. Johns Ditch and Dry Run Ditch.

ST. JOHNS DITCH SUB-PROJECT area begins at the St. Johns Bayou floodgate and extends westward to the Farrenburg levee. It extends northward to the end of this levee and continues northward along the east boundary of Sikeston Ridge to U. S. Highway 60 at the east edge of Sikeston, Missouri. The area extends eastward along this highway for a distance of approximately four miles where it turns in a southeasterly direction on approximately the 310 MSL contour and continues southeasterly to the intersection of the New Madrid Floodway setback levee about two and one-half miles northeast of Anniston, Missouri. The sub-project area follows southwesterly along this setback levee to the point of beginning at the St. Johns Bayou floodgate.

DRY RUN DITCH SUB-PROJECT area begins on the Farrenburg levee at the north edge of New Madrid, Missouri and extends in a northwesterly direction along the watershed boundary between Little River Basin and Dry Run Ditch to the intersection of U. S. Highway 61 and Missouri State Highway 80 (about one mile east of Matthews, Missouri). The area extends eastward along State Highway 80 to the east boundary of Sikeston Ridge where it turns southward to the

north end of the Farrenburg levee. The area extends southward along this levee to the point of beginning at New Madrid, Missouri.

The proposed St. Johns Bayou Project is designed to serve as major outlets for drainage systems for a total of 100,740 acres and to provide for additional capacity for adjacent upland drainage.

For the purpose of evaluation, the Corps of Engineers has subdivided these sub-project areas into three zones relating to flood reduction and drainage benefits. The A Zone is a zone in which only drainage benefits are calculated since the land within this zone lies above the maximum flood line. The B Zone is a zone of flood reduction and drainage benefit calculations. The C Zone is a zone of no project benefits.

These sub-project areas are principally agricultural in nature and benefits accruing from the project will be almost entirely by the provision of adequate outlets for farm drainage in the A and B Zones and by flood abatement in the B Zone.

General farming predominates in these sub-project areas with corn, cotton, soybeans, small grain, hay and pasture as the principal crops.

SOILS

The soils of the area include fine textured poorly drained soils, silty medium textured soils of moderate to slow drainage, silty and sandy overwash soils, and sandy excessively drained soils. This total range of soil conditions has been subdivided into 7 soil units for the purpose of the project study. Soil units as delineated on the soil map may include unmappable inclusions of other kinds of soil usually so small that their occurrence is not considered significant to the project study.

By far the greater portion of the soil areas occur on nearly level to depressional topography. Generally the heavier more poorly drained soils occur on the lower elevations with the siltier and better drained soils occurring on slightly higher elevations or with slightly more gradient. The sandy soils normally occupy higher elevations with some few acres of sloping sandy soils occurring in the northwestern portion of the project area. The soil pattern is characterized by the finer textured, very poorly drained soils being most extensive and occurring in large uniform bodies in the southern part of the St. Johns Ditch sub-area. The better drained silty and sandy soils occur more frequently in the northern parts of the St. Johns Ditch sub-area and throughout the Dry Run Ditch sub-area. The soil pattern is characterized by the poorer drained soils occupying the lower elevations and the better drained soils occurring on the slightly higher generally elongated north-south areas which occur intermittently throughout the project area. Drainage is generally to the south.

The poorly drained clay soils are the most poorly developed for agricultural production but constitute some of the highest potential production increments from drainage improvement. The medium to coarse textured soils are normally well to moderately well drained, are much more highly developed

agriculturally and are adapted to a wider range of crops than are the heavier soils.

An analysis of the soil conditions throughout the project area indicate that the C Zone (St. Johns Ditch sub-area only) is 95% soil unit 1 (fine textured very poorly drained); the B Zone of St. Johns Ditch sub-area is 65% soil unit 1 and the A Zone of St. Johns Ditch sub-area is 30% soil unit 1. Soil unit 1 is the most extensive soil in the project area occurring on about 43% of the total area. The next most extensive soil in the total project is a similar soil with a more recent silty overwash covering (soil unit 6). It covers 18% of the total project area and occurs in both sub-areas. The next most extensive soil is a sandy well drained soil (Soil Unit II and 11S) occurring on about 15% of the total project and making up one-half of the A Zone of St. Johns Ditch sub-area. The remainder of the soil units amount to less than 25% of the total area in the following proportion: Soil unit 2 - 8%; Soil unit 3 - less than 1%; Soil unit 4 - 6%; Soil unit 9 - 9%.

A brief description of each soil unit follows:

Soil Unit 1 consists of dark colored soils, with fine textures from the surface throughout. They are very poorly drained and difficult to till but are very fertile if adequate drainage is applied. These soils generally occur in the lower lying or depressional areas in old meanders of stream channels.

Soil Unit 2 consists of soils primarily dark colored with moderately fine textures from the surface throughout. They are moderate to somewhat poorly drained. They are similar to the soils of Unit 1 but have some better natural drainage. Normally, they occur adjacent to but in elevations slightly above the lower lying areas of soil unit 1. These soils have frequent low spots, require some drainage and are quite productive when drained.

Soil Unit 3 is similar to soil unit No. 1. It occurs in the lowest lying areas of the Mississippi flood plain and differs from soil unit No. 1 in that it consists of an intermingling of fine (clay) and coarse (sand) textured soils. The fine textured materials dominate the group and the area is generally poorly drained. The sandy streaks and spots are naturally better drained and often are excessively drained and occur normally on slightly higher ground but the net effect is a mixture of fine and sandy soils which are poorly drained except in the minor areas of sandier spots. The area is quite productive but the wet and dry spots cause a "spotty" condition in all seasons.

Soil Unit 4 consists of medium textured (loams, silt loams and silty clay loam) soils that are moderately drained. Small unmappable spots of poorly drained areas may occur in the lower old narrow channels. The area as a whole is moderately drained with the exception of the few low poorly drained spots. Productivity is normally quite high and the soils respond well to drainage and fertility treatments.

Soil Unit 6 consists of soils similar to the soils in soil unit 1, however, they have been covered by lighter colored, more recently

deposited silty textured surface materials to depths from 8 to 12 inches. The soils are poorly drained but due to the silty overwash material they dry out in the surface somewhat sooner than the heavier textured soils of unit 1. Frequent low, wet spots occur and the soils are of low inherent fertility. They respond well to drainage, however, and with treatment are moderately productive.

Soil Unit 9 consists of well and moderately well drained medium textured (silty) soils. They normally occur on slightly higher elevations. These soils are normally adequately drained and quite productive when fertility applications are applied.

Soil Unit 11 and 11S consist of medium (loam) and coarse (sand) textured soils which are well to excessively drained. Slopes are generally nearly level but some areas in excess of 1% grade do occur, these have been designated on the map by the symbol "S" which indicates a sloping phase. These sandy soils are limited in crop adaptation and are droughty in the dry seasons.

LAND USE

Approximately 83% of the project study area is open land, 15% is wooded land; urban and water areas account for 1% each. By far the greater portion (over 99%) of the Zone A is open land. The B Zone of Dry Run Ditch sub-area is also nearly 100% open whereas the B Zone of St. Johns Ditch is about 72% open land and 28% wooded. The C Zone (St. Johns Ditch only) is nearly 80% wooded and 20% open.

The greater part (94%) of the wooded areas occur on soil units 1 and 6, which are very poorly drained soils with fine textured surfaces or silty overwash surface soils. Of the total wooded areas slightly over one-half occur in the B Zone and slightly under one-half in the C Zone with very little in the A Zone.

The woodlands in the three zones of the project area are comparatively uniform in stocking and growth rates and show excellent potential. General condition indicates that on the average an equivalent of partial level management is being practiced. Red and white oaks, cypress and sweet gum are the predominant species. Most of the cypress is found in the C Zone. Growth rates are above Delta averages. The A Zone is now almost completely cleared and clearing in B Zone is proceeding at a rapid rate. Clearing in the C Zone is proceeding at a lower rate, mostly in the northern part. With adequate drainage a large part of this may eventually be converted to crop land.

Areas recently logged show observance of diameter limit cutting and species selection probably arising from market conditions. In general, restocking, as shown by volumes existing in pole size trees, is fairly satisfactory. Fire, and to a lesser extent, grazing damage is a limiting factor on forest production and is particularly so in Zones A and B.

CROPPING PATTERN

Cotton, corn, soybeans, wheat, and permanent pasture make up the primary crops upon which the analysis is based. Approximate percentages of present crops within the entire project area are cotton 23%, corn 22%, soybeans 36% small grain 9% and permanent pasture 10%. The 1956 cropping pattern was used to represent the present condition.

Analysis of Tables II and IV reveal no appreciable difference in cropping pattern with the program in effect. Soybeans and permanent pasture will decrease slightly while small grain and hay acreage will increase slightly. The shift in cropping between zones is perhaps the most significant change. With the project in place cotton acreage generally will decrease in the A Zone and increase in the B Zone. Soybean acreage will decrease in both the A and B Zones with the decreased acreage being converted primarily to small grain, hay and pasture.

YIELDS

Field crop and pasture yields are estimates of yields that are currently being attained or that can be expected to be attained by producers using a reasonable level of management, under future conditions with and without drainage. All yields, in all zones, are for average flood-free conditions. Within the B Zone, under future with project conditions, there are varying percentages of total acreage on which it is expected there will be non-participation in farm drainage. These percentages were used in computing weighted yields, the yields being weighted in proportion to percentage of land undrained and drained. Computations for the A Zone are only for net acreage to be drained, and since none of the acreage in the C Zone will be drained, weighting of yields was unnecessary in these two zones. Within the A and B Zones, under present and future without project conditions, it was not considered there are or will be any completely effective farm drainage systems in place. Crop yield estimates were based on this condition.

Woodland yields are based on field sampling studies and analysis conducted in the area by the U. S. Forest Service. Yields are derived from applicable average growth rates adjusted to the species, stand sizes and ages found in the area. The yields represent the units of wood products and values that can be expected to prevail, based on present findings and trends. Increments or annual production and value, due to the application of high level management, have been discounted to present worth. Board foot and cubic foot yields are computed in the working papers, but for simplicity are not shown in Table II and are expressed as a present worth value per acre in Table III.

PRICES

Projected field crop and livestock prices used in this report were developed jointly by the Agricultural Research Service and Agricultural Marketing Service. Projected prices have been used, based on most likely expectations, and estimates of cropping patterns have been influenced by the assumption that such prices will prevail. Projected prices were developed

from studies of the long-range prospective conditions of product supplies and requirements. In order to remove the effects of price support programs, and in order to reflect the economy of production in competing areas, the projections assume the eventual attainment of a relatively free market for agricultural products. In evaluating the long run aspects of deferred land development and improvement projects, the use of the projected prices makes it unnecessary to restrict the acreage of "control" crops in crop income computations.

Forest product values are based on 1955 prices and are f.o.b. millyard or siding. These prices are considered to be realistic price projection for future conditions. There are good markets for sawlogs and speciality material (cooperage stock, veneer and handle material). A limited amount of pulpwood is presently being taken from the project area and this outlet may be expected to increase in importance. In general, the marketing possibilities of the area are excellent.

Forest production values shown for the future without project conditions have been discounted to present worth on all increments in production and value due to application of high level management and for any time lag in the availability of forest products for harvest.

CROP PRODUCTION COSTS

Forest Products

Production costs for forest products are based on costs prevailing in the project locality during 1955. These costs are estimated to be a reasonable level for projection to future conditions. Costs cover conversion of standing timber to raw wood products at mill or siding, including a return to management, (harvest cost) and a cultural and crop management cost (preharvest) consisting of an amortized annual charge for timber stand improvement work, an allowance for management and supervision by owners, their representatives, and foresters, and forest protection. The conversion cost varies by product and per acre yield level. Preharvest costs have been treated as fixed annual per acre charges weighted by level of management. All costs of conversion of standing trees to forest products have been discounted to present worth in the same manner as production values.

Field Crop and Livestock Products

Production costs for all field crop and livestock enterprises were developed from a study of large and small Mississippi River bottomland farms. Because production costs by enterprises are not the same for large as for small farms, these costs were weighted in accordance with the proportionate acreage of land in large and small farms expected to exist in the project area under future conditions. Production costs, as used for project evaluation purposes, include all operational costs required to attain yield levels indicated in project cost tables (such as allowances for all labor, power, machinery, and materials required to produce and market the product). All farm overhead costs necessary in farm operation (except a charge for land) and an allowance for management expense, which includes an estimated amount required for the operator's management and for any employed management personnel or services, are included in the production costs.

Land charges were omitted from the cost analysis because net returns to land were being determined for conditions with and without the project features. Overhead costs include such items as a charge for buildings, maintenance and replacement of farm machinery, interest on investment, insurance, and personal property taxes. Specified production costs are all costs incurred in production and marketing of the crop or livestock charges. Overhead and management costs were allocated to each enterprise in proportion to the specified costs of production expended on the enterprise. Some production costs were treated as variables with yield levels attained (most harvest costs, fertilizer, poisoning, etc.) while other costs were assumed to be fixed regardless of yield (soil preparation, cultivation, and a portion of machine-picking cost). Preharvest, harvest, overhead and management costs were computed separately to derive total crop production costs.

Production costs used for projections are approximately 96% of the 1955 level of costs incurred by farmers.

Crop yields and production costs relationships are not the same for summary tables (all soils) as for the individual soil unit tables from which the summary tables are constructed. A small portion of this difference is statistical in nature (statistical error due to rounding to commonly used units) and can be ignored. The major difference, however, is due to the computing of both yields and production costs in the summary tables where total production and total costs of each crop for all soils is divided by the total acreage of that crop. If all costs bore a direct (straight-line) relationship to yields, these differences, except for statistical error, would not occur. Because this situation does not exist, an entirely accurate production cost for a given yield in the summary tables cannot be read from the standard cost tables that were developed. To get an entirely accurate detailed cost (preharvest, harvest, overhead and management) in the summary tables that would be comparable to the costs used in the individual soil unit tables, it would be necessary to weight each of the components of total cost with the same acreage used in the individual soil unit tables.

The difference between the computed costs used in the summary tables for a given yield and the unweighted costs (standard cost tables) is not expected to exceed 10% on any given component of total cost--spot checks of actual data have not exceeded 5%. Therefore, unless greater accuracy is desired than that provided by summary tables, it will not be necessary to weight detailed cost data for flood damage analysis purposes if standard detailed cost tables are used in determining such costs.

NET CROP PRODUCTION RETURNS

The analysis of crop production by soil units, upon which the summary tables are based, generally indicates the gross value of production to be greater than production costs. For the future conditions without the project, however, production costs of some crops on some of the soil units are higher than gross value of the crop. A correction has been made in the summary tables to remove the effect of these negative net returns where they occur. In making the correction, the actual returns for the negative net returns was assumed to be zero. In the long run, shifts in land use may be expected that would largely avoid the losses incurred with the cropping system. By

indicating a net income of zero, crops having a negative net return, the net error involved is negligible, and well within the limits of error in basic information used in project area analysis. Higher yields, as expected, show larger net returns to land than lower yields for the same enterprise. Inasmuch as the analysis assumes flood-free yields, consideration has not been given to the effect of flood damage on average annual net income.

LAND USE CONVERSIONS AND COSTS

Table VI shows the land use conversions that are anticipated with the project in place and the subsequent development of farm drainage systems. Presently there is only a small amount of timber in the Dry Run Ditch subarea; nearly all of that remaining is because of wet land. If and when complete drainage is effected, it is anticipated approximately 80% of this will be cleared. Clearing in the B and C Zones of the St. Johns Ditch subarea is presently progressing at a very rapid rate. If and when complete drainage is effected it is estimated approximately 75% of the woodland in the B Zone will be cleared. Woodland in the A Zone is very minor (only 147 ac.) and it is assumed this will remain in farm woodlots. It is also assumed that 25% of the C Zone will be cleared regardless of the project.

It is anticipated that the conversion will be complete within 10 years with the project installed.

Items of conversion costs include all expense of putting land from its present state into condition to produce a crop with only normal production costs remaining to be incurred. All capital costs of conversion have been amortized at 5% for a period of 50 years.

FARM DRAINAGE SYSTEMS AND COSTS

Table VII contains estimates of amounts and costs of farm drainage systems that can be expected after satisfactory major outlets and connecting group drainage systems are developed. These estimates are based on the expectation that all future open lands need drainage, except soil units 9, 11 and 11S; also that no completely effected drainage of any magnitude will be accomplished under future without project conditions and that an estimated 10% will not be drained because of lack of farmer participation. Any farm drainage now in place is considered as inadequate, or not a completely effective system and additional drainage is needed. Allowance has been made for this condition in crop yields and installation and maintenance costs.

Costs, computed at current levels, include the installation (construction, engineering and contingency) costs required for farm drainage systems for satisfactorily rapid removal of surface water accumulations that are likely to occur for the various conditions of rainfall and runoff involved. Requirements vary by soil mapping units and by land use. Costs include all ditching and appurtenant structural needs for system to serve an average of one square mile. Estimates are based on standard design data for conditions involved.

Farm drainage system capital costs have been amortized for useful life period of 15 years for crop land and 20 years for pasture land, both at 5%. Maintenance costs, varying with the soil mapping unit and land use, have been added to the amortized annual equivalent of installation cost to derive the annual cost of farm drainage system.

GROUP DRAINAGE SYSTEMS AND COSTS

Group Drainage proposed in the Dry Run Ditch sub-area consists of measures designed for the rehabilitation and extension of existing system. The St. Johns Ditch sub-area is well provided with group drainage facilities at the present time by the St. Johns Bayou Drainage District. The proposed group drainage systems costs have been amortized for twenty years at 3½%. This 20 year period is in accordance with experience in this area.

Table VIII in the Dry Run Ditch sub-area itemizes the costs (construction, engineering, and contingencies) required to install and maintain the group drainage ditches and appurtenant structures. Maintenance costs have been added to the amortized cost to derive the total annual cost of group drainage.

BENEFITS AND ASSOCIATED COSTS

Table IX summarizes net annual returns from Tables III and IV for Zones A and B, annual costs of making land conversions (from Table VI), and establishing and maintaining farm and group drainage systems (Tables VII and VIII).

Returns and gross benefit and all associated cost items have been discounted in column 3, Table IX to account for estimated lag and build-up periods to full installation and maintenance requirements, and benefit accrual. The 10 year lag periods used as a basis for discounting benefits and associated costs are based on past experiences and observations in similar areas.

SUMMARY

The St. Johns Bayou Project provides for a common pumping plant for both sub-areas and some main ditch channel improvements in the St. Johns Ditch sub-area.

The Dry Run Ditch sub-area, and all the A Zone and approximately two-thirds of the B Zone of the St. Johns Ditch sub-area are all highly developed agriculturally. The remainder of the St. Johns Ditch sub-area would also be highly developed if drainage could be provided, as the soil has a high potential for agricultural purposes.

The study shows increased production from drainage benefits to be provided by the project. Some clearing will result in the lower part of the project area, but it is anticipated that the land use pattern will not be greatly changed. Yields will be materially increased, however, due to improved drainage conditions provided.

Yields for flood-free years have been used throughout this report. The Corps of Engineers, therefore, may need to modify the future without project values to account for flood damage. They may also need to modify future with project values to account for less than complete flood protection under project conditions.

PROJECT - ST. JOHNS BAYOU
Sub-area-Dry Run Ditch

MISSISSIPPI RIVER

(Missouri)

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

TABLE I
PRESENT LAND USE

Zone	Soil Mapping Unit	Open	Wooded	Total
		(Acres)	(Acres)	(Acres)
Zone A	2	6,571	90	6,661
	4	930	-	930
	6	435	-	435
	9	7,970	19	7,989
	11	105	-	105
	11S	180	-	180
Sub-total - all soils		16,191	109	16,300
Total - Zone A		16,191	109	16,300
Zone B	1	75	-	75
	2	210	-	210
	4	1,850	45	1,895
	6	2,815	135	2,950
Sub-total - all soils		4,950	180	5,130
Total - Zone B		4,950	180	5,130
Sub-area total - all soils		21,141	289	21,430
GRAND TOTAL - Sub-area		21,141	289	21,430

Basin - Mississippi River
Project - St. Johns Bayou
Sub - area - Dry Run Ditch
State - Missouri

SUMMARY - TABLE II A
(Zone for Drainage Calculations Only)
COMPUTATION OF AGRICULTURAL PRODUCTION
EXISTING CONDITIONS

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Per Acre 2/	Total
All	Open land	7,936			
	Crops	7,142			
	Cotton lint	2,118	Lbs.	313.0	663,000
	Cotton Seed	(2,118)	Ton		596.70
	Corn	1,365	Bushel	30.6	41,790
	Soybeans	2,529	Bushel	20.3	51,357
	Sm. Gr. (Wheat) 3/	773	Bushel	15.5	12,015
	Lespedeza 4/	(65)		90	5,850
	Perm. Pasture	357	Lbs.Beef	103.5	36,940
	Other land 5/	794			
	Woodland	90			
	Total	8,026 6/			

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Several other small grains will be used, but all lumped together with wheat as base.
4/ This lespedeza acreage was over-seeded in wheat.
5/ Farmsteads, farm roads, waste and non-agricultural.
6/ 8,274 acres of soils not needing drainage (9, 11 and 11S) are not included.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

SUMMARY - TABLE III A
(Zone for Drainage Calculations Only)
COMPUTATIONS OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS, FUTURE CONDITIONS WITHOUT PROJECT (Based on projected prices)

Soil Unit	Land use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre 2/	Production Total	Value of Production Per Unit Dollars	Value of Production Total Dollars	Cost of Production Per Acre Dollars 3/	Cost of Production Total Dollars	Net Return Dollars
All	Open land	7,143								
	Crops	6,429								
	Cotton lint	1,906	Lbs.	344.8	657,115	0.24	157,708	95.44	181,908	12,172
	Cotton Seed	(1,906)	Ton		591.41	61.50	36,372			
	Corn	1,228	Bushel	35.9	44,105	1.45	63,953	28.81	35,375	28,578
	Soybeans	2,276	Bushel	22.5	51,237	2.30	117,845	28.25	64,290	53,555
	Sm.Gr. (Wheat) 4/	696	Bushel	17.9	12,432	1.60	19,891	19.63	13,659	6.232
	Lespedeza	(59)	Lbs. Beef	100.0	5,900	0.209	1,233	15.07	889	344
	Perm. Pasture	323	Lbs. Beef	136.5	44,080	0.209	9,212	20.46	6,610	2,602
	Other Land 6/	714								
	Woodland	90				12.16	1,094	6.25	563	531
	Total	7,233 7/					407,308		303,294	104,014

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ This lespedeza acreage was over-seeded in wheat.
6/ Farmsteads, farm roads, waste and non-agricultural.
7/ Does not include 793 acres of non-participation in farm drainage.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

SUMMARY - TABLE IV A
(Zone for Drainage Calculation Only)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS: FUTURE CONDITIONS WITH PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre	Production Total	Value of Production Per Unit Dollars	Value of Production Total Dollars	Cost of Production Per Acre Dollars 3/	Cost of Production Total Dollars	Net Return Dollars
				2/						
All	Open Land	7,233								
	Crops	6,510								
	Cotton Lint	1,453	Lbs.	470.7	683,950	0.24	164,148	122.92	178,614	23,392
	Cotton Seed	(1,453)	Ton		615.57	61.50	37,858			
	Corn	1,590	Bushel	61.9	98,420	1.45	142,709	48.88	77,723	64,986
	Soybeans	1,590	Bushel	30.2	48,002	2.30	110,405	33.14	52,695	57,710
	Sm.Gr. (Wheat) 4/	939	Bushel	25.2	23,700	1.60	37,920	26.58	24,958	12,962
	Lespedeza 5/	(654)	Lbs.Beef	207.2	135,525	0.209	28,325	26.82	17,538	10,787
	Hay & Pasture 6/	326	Lbs.Beef	207.2	67,550	0.209	14,118	32.01	10,436	3,682
	Perm. Pasture	612	Lbs.Beef	204.5	125,125	0.209	26,151	31.61	19,348	6,803
	Other Land 7/	723								
	Total	7,233 8/					561,634		381,312	180,322

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ This lespedeza acreage was over-seeded in wheat.
6/ This item considered cropland in rotation.
7/ Farmsteads, farm roads, waste and non-agricultural.
8/ Does not include 793 acres non-participation in farm drainage.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

SUMMARY - TABLE II B
(Zone for Drainage and Flood Control Calculations)
COMPUTATION OF AGRICULTURAL PRODUCTION
EXISTING CONDITIONS

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Per acre 2/	Total
All	Open land	4,950			
	Crops	4,455			
	Cotton lint	1,336	Lbs.	341.1	455,700
	Cotton Seed	(1,336)	Ton		410.13
	Corn	847	Bushel	32.0	27,080
	Soybeans	1,566	Bushel	20.8	32,528
	Sm. Gr. (Wheat) 3/	496	Bushel	16.7	8,275
	Perm. Pasture	210	Lbs. Beef	139.5	29,300
	Other land 4/	495			
	Woodland	180			
	Total	5,130			

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Several other small grains will be used, but all lumped together with wheat as base.
4/ Farmsteads, farm roads, waste and non-agricultural.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

SUMMARY - TABLE III B
(Zone for Drainage and Flood Control Calculations)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS, AND NET RETURNS: FUTURE CONDITIONS WITHOUT PROJECT (Based on projected prices)

Soil Unit	Land use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre 2/	Production Total	Value of Production Per Unit Dollars	Value of Production Total Dollars	Cost of Production Per Acre Dollars 3/	Cost of Production Total Dollars	Net Returns Dollars
All	Open Land	5,000								
	Crops	4,500								
	Cotton lint	1,349	Lbs.	376.5	507,900	0.24	121,896	102.34	138,057	11,952
	Cotton Seed	(1,349)	Ton		457.11	61.50	28,113			
	Corn	856	Bushel	37.9	32,480	1.45	47,096	30.29	25,925	21,171
	Soybeans	1,581	Bushel	23.4	37,042	2.30	85,197	28.80	45,533	39,664
	Sm.Gr. (Wheat) 4/	502	Bushel	19.7	9,878	1.60	15,805	21.32	10, 701	5,104
	Perm. Pasture	212	Lbs.Beef	162.6	34,480	0.209	7,206	24.74	5,244	1,962
	Other land 5/	500								
	Woodland	80				12.16	973	6.25	501	472
	Total	5,080 6/					306,286		225,961	80,325

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ Farmsteads, farm roads, waste and non-agricultural.
6/ Does not include 50 acres woodland to remain in woodland.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

SUMMARY - TABLE IV B
(Zone for Drainage and Flood Control Calculations)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS: FUTURE CONDITIONS WITH PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre	Production Total	Value of Production Per Unit Dollars	Value of Production Total Dollars	Cost of Production Per Acre Dollars 3/	Cost of Production Total Dollars	Net Return Dollars
				2/						
All	Open Land	5,080								
	Crops	4,572								
	Cotton Lint	1,331	Lbs.	488.5	650,156	0.24	156,037	126.91	168,925	23,099
	Cotton Seed	(1,331)	Ton		585.14	61.50	35,987			
	Corn	965	Bushel	62.7	60,480	1.45	87,696	50.31	48,545	39,151
	Soybeans	1,119	Bushel	29.9	33,426	2.30	76,880	32.94	36,855	40,025
	Sm.Gr. (Wheat) 4/	510	Bushel	25.4	12,941	1.60	20,705	26.80	13,666	7,039
	Lespedeza 5/	(255)	Lbs.Beef	225.7	57,545	0.209	12,027	28.63	7,300	4,727
	Hay & Pasture 6/	302	Lbs.Beef	227.6	68,738	0.209	14,366	35.11	10,604	3,762
	Perm.Pasture	345	Lbs.Beef	227.6	78,527	0.209	16,412	35.11	12,113	4,299
	Other Land 7/	508								
	Total	5,080 8/					420,110		298,008	122,102

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ This lespedeza acreage was over-seeded in wheat.
6/ This item considered cropland in rotation.
7/ Farmsteads, farm roads, waste and non-agricultural.
8/ Does not include 50 acres of woodland to remain in woodland.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

TABLE V

REACH SUMMARY BY SOIL MAPPING UNITS

Soil Unit	Acres	Future Without Project (Production) Gross Value	Cost	Net Value	Future With Project (Production) Gross Value	Cost	Net Value	Difference In Net Value
				ZONE A				
2	6,004	321,438	238,313	83,125	443,299	296,248	147,051	63,926
4	837	65,271	50,125	15,146	88,724	65,286	23,438	8,292
6	392	20,599	14,856	5,743	29,611	19,778	9,833	4,090
Total 1/	7,233	407,308	303,294	104,014	561,634	381,312	180,322	76,308
				ZONE B				
1	75	2,659	1,632	1,027	4,490	2,189	2,301	1,274
2	210	11,773	8,310	3,463	18,283	13,090	5,193	1,730
4	1,895	145,876	111,912	33,964	186,486	139,422	47,064	13,100
6	2,900	145,978	104,107	41,871	210,851	143,307	67,544	25,673
Total 2/	5,080	306,286	225,961	80,325	420,110	298,008	122,102	41,777
GRAND TOTAL	12,313	713,594	529,255	184,339	981,744	679,320	302,424	118,085

1/ Does not include 8,274 acres not needing drainage; and 793 acres of non-participation in farm drainage.

2/ Does not include 50 acres woodland to remain in woodland.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

TABLE VI
LAND CONVERSION WITH PROJECT

Type of Conversion	Total Amount	Cost of Clearing	Cost of Smoothing	Total Cost
	Acres	Dollars	Dollars	Dollars
Per Acre				
W to GC 1/		55.00	15.00	70.00
Project				
W to GC	170	9,350.00	2,550.00	11,900.00
Total Project		9,350.00	2,550.00	11,900.00
Annual Amortized Value 2/				652.00
Total Annual Cost of conversion				652.00

1/ W - Woodland; GC - general dry-farmed crops
2/ Amortized at 5% for 50 years.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Misssouri

TABLE - VII
ANALYSIS OF FARM DRAINAGE SYSTEM COSTS

Soil Mapping Unit and Land Use		(Acres) Area	Total Cost Installation 1/	Annual Equivalent Cost 2/	Annual Maintenance Cost	Total Annual Cost
1	General Crops	61	648	62	75	137
1	Permanent Pasture	-				
	Total	61 3/	648	62	75	137
2	General Crops	5,034	49,932	4,810	5,761	10,571
2	Permanent Pasture	540	3,391	272	78	350
	Total	5,574 3/	53,323	5,082	5,839	10,921
4	General Crops	2,115	19,851	1,912	2,291	4,203
4	Permanent Pasture	173	792	64	18	82
	Total	2,288 3/	20,643	1,976	2,309	4,285
6	General Crops	2,458	23,998	2,312	3,692	6,004
6	Permanent Pasture	244	1,588	127	122	249
	Total	2,702 3/	25,586	2,439	3,814	6,253
GRAND TOTAL		10,625 3/	100,200	9,559	12,037	21,596

1/ Includes engineering and contingency.
2/ Farm drainage for cropland amortized at 5% over 15 years, and for pasture over 20 years. Maintenance costs are estimated to be high enough to produce this length of life.
3/ Not including 10% "other" for farmsteads, farm roads, waste and non-agricultural.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

TABLE VIII

ANALYSIS OF GROUP DRAINAGE NEEDS AND COSTS

Item	Unit	Amount	Unit Cost	Total Cost
			Dollars	Dollars
Excavation	Cu. Yds.	387,873	0.13	50,423
Spreading Spoil	Cu. Yds.	387,873	0.03	11,636
Clearing Right-of-Way	Acres	55	60.00	3,300
Right-of-way Easements	Acres	60	100.00	6,000
Crossings -- a.	Each	6	1,600.00	9,600
b.	Each	2	1,200.00	2,400
c.	Each	2	1,000.00	2,000
Swinging Water Gaps	Each	0	0	0
Grade Control Structures (Farrenburg Levee Outlet Str.)	Each	1	17,500.00	17,500
Flap Gates	Each	0	0	0
Vegetative Plantings	Acres	0	0	0
Total Construction Cost				102,859
Engineering Cost				10,286
Contingencies and Legal Costs				10,286
Total Installation Costs				123,431
Annual Equivalent - Installation Cost (Amortized for 20 years at $3\frac{1}{2}$ percent) -- (.07036)				8,685
Annual Maintenance Costs (5 percent of Construction Cost)				5,143
Total annual cost of required group facilities				13,828

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - Dry Run Ditch
State - Missouri

TABLE IX

SUMMARY OF ANNUAL NET PRODUCTION RETURNS AND ASSOCIATED COSTS

Item	Total	Discounted Amount	
	Dollars	Dollars	
1. Net Return with Project	302,424		
2. Net Return without Project	184,339		
3. Gross Benefit to Project	118,085	93,606	1/
4. Farm Drainage Costs			
a. Installation Cost	9,559		
b. Maintenance Cost	12,037		
c. Total	21,596	17,119	1/
5. Group Drainage Cost			
a. Installation Cost	8,685		
b. Maintenance Cost	5,143		
c. Total	13,828	11,483	2/
6. Total Conversion Cost	652	517	1/
TOTAL ASSOCIATED COSTS	36,076	29,119	

1/ Discounted amounts reflect an estimated 10-year lag @ 5% (0.79270) to full benefit accrual.
2/ Discounted amounts reflect an estimated 10-year lag @ 3½% (0.8304) to full benefit accrual.

PROJECT - ST. JOHNS BAYOU
Sub-area-St. Johns Ditch

MISSISSIPPI RIVER

(Missouri)

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area- St. Johns Ditch
State - Missouri

TABLE I
PRESENT LAND USE

Zone	Soil Mapping Unit	Open (Acres)	Wooded (Acres)	Water (Acres)	Urban (Acres)	Total (Acres)
Zone A	1	9,587	32	-	-	9,619
	4	1,822	13	-	-	1,835
	6	3,797	102	-	-	3,899
	11	13,259	57	-	-	13,316
	11S	3,999	13	-	-	4,012
Sub-total - all soils		32,464	217	-	-	32,681
Water				189		189
Urban					800	800
Total - Zone A		32,464	217	189	800	33,670
Zone B	1	17,696	6,062	-	-	23,758
	2	96	31	-	-	127
	3	286	550	-	-	836
	4	500	84	-	-	584
	6	8,365	1,085	-	-	9,450
	11	1,057	88	-	-	1,145
Sub-total - all soils		28,000	7,900	-	-	35,900
Water				400		400
Total - Zone B		28,000	7,900	400	-	36,300
Zone C	1	1,735	6,520	-	-	8,255
	4	160	-	-	-	160
	6	265	-	-	-	265
Sub-total - all soils		2,160	6,520	-	-	8,680
Water				660		660
Total - Zone C		2,160	6,520	660	-	9,340
Sub-area total-all soils		62,624	14,637			77,261
Water				1,249		1,249
Urban					800	800
GRAND TOTAL - Sub-area		62,624	14,637	1,249	800	79,310

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE II A
(Zone for Drainage Calculations Only)
COMPUTATION OF AGRICULTURAL PRODUCTION
EXISTING CONDITIONS

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Per Acre 2/	Total
All	Open Land	15,206			
	Crops	13,685			
	Cotton Lint	3,633	Lbs.	254.2	923,400
	Cotton Seed	(3,633)	Ton		831.06
	Corn	3,336	Bushel	24.9	83,140
	Soybeans	3,897	Bushel	16.4	64,013
	Sm. Gr. (Wheat) 3/	1,620	Bushel	15.9	25,695
	Permanent Pasture	1,199	Lbs. Beef	101.8	122,060
	Other Land 4/	1,521			
	Woodland	147			
	Total	15,353 5/			

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Several other small grains will be used, but all lumped together with wheat as base.
4/ Farmsteads, farm roads, waste and non-agricultural.
5/ Does not include 17,328 acres not needing drainage; 189 acres of water; and 800 acres urban.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE III A
(Zone for Drainage Calculations Only)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS: FUTURE CONDITIONS WITHOUT PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre 2/	Production Total	Value of Production Per Unit Dollars	Value of Production Total Dollars	Cost of Production Per Acre Dollars 3/	Cost of Production Total Dollars	Net Return Dollars
All	Open Land	13,685								
	Crops	12,316								
	Cotton Lint	3,270	Lbs.	280.1	915,825	0.24	219,799	81.87	267,705	2,766
	Cotton Seed	(3,270)	Ton		824.25	61.50	50,692			
	Corn	3,003	Bushel	28.6	85,958	1.45	124,640	25.11	75,396	49,244
	Soybeans	3,507	Bushel	18.6	65,059	2.30	149,636	25.08	87,973	61,663
	Sm. Gr. (Wheat) 4/	1,457	Bushel	17.9	26,777	1.60	42,843	20.31	29,591	13,252
	Perm. Pasture	1,079	Lbs.Beef	118.9	128,305	0.209	26,817	17.19	18,550	8,267
	Other Land 5/	1,369								
	Woodland	0								
	Total	13,685 8/					614,427		479,215	135,212 6/ 144,107 7/

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ Farmsteads, farm roads, waste and non-agricultural.
6/ Includes negative net return.
7/ Adjusted to eliminate negative net returns.
8/ Does not include 17,328 acres not needing drainage; 189 acres of water; 800 acres of urban area; 1521 acres of non-participation in farm drainage; and 147 acres of woodland to remain in woodland.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY TABLE IV A
(Zone for Drainage Calculations Only)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS: FUTURE CONDITIONS WITH PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre 2/	Production Total	Value of Production Per Unit Dollars	Value of Production Total Dollars	Cost of Production Per Acre Dollars 3/	Cost of Production Total Dollars	Net Return Dollars
All	Open Land	13,685								
	Crops	12,316								
	Cotton Lint	2,759	Lbs.	443.3	1,223,000	0.24	293,520	116.13	320,408	40,805
	Cotton Seed	(2,759)	Ton		1,100.71	61.50	67,693			
	Corn	3,005	Bushel	55.5	166,790	1.45	241,846	44.18	132,751	109,095
	Soybeans	3,782	Bushel	30.2	114,050	2.30	262,315	33.06	125,032	137,283
	Sm. Gr. (Wheat) 4/	1,847	Bushel	24.1	44,508	1.60	71,213	25.57	47,232	23,981
	Lespedeza 5/	(456)	Lbs.Beef	233.1	106,300	0.209	22,217	28.77	13,119	9,098
	Hay & Pasture 6/	154	Lbs.Beef	225	34,650	0.209	7,242	34.08	5,248	1,994
	Perm. Pasture	769	Lbs.Beef	214.8	165,175	0.209	34,522	32.51	25,003	9,519
	Other Land 7/	1,369								
	Total	13,685 8/					1,000,568		668,793	331,775

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ This lespedeza acreage was over-seeded in wheat.
6/ This item considered cropland in rotation. Although part of the acreage is used for hay, the entire acreage was evaluated on the basis of pasture land.
7/ Farmsteads, farm roads, waste and non-agricultural.
8/ Does not include 17,328 acres not needing drainage; 189 acres of water; 800 acres of urban area; 1,521 acres of non-participation in farm drainage; and 147 acres of woodland to remain in woodland.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE II B
(Zone for Drainage and Flood Control Calculations)
COMPUTATION OF AGRICULTURAL PRODUCTION
EXISTING CONDITIONS

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Per Acre 2/	Total
All	Open Land	28,000			
	Crops	25,200			
	Cotton Lint	5,329	Lbs.	247.1	1,316,850
	Cotton Seed	(5,329)	Ton		1,185.17
	Corn	6,166	Bushel	25.0	154,225
	Soybeans	10,921	Bushel	16.7	182,101
	Sm. Gr. (Wheat) 3/	2,407	Bushel	15.9	38,345
	Lespedeza 4/	(448)	Lbs. Beef	93.8	42,010
	Perm. Pasture	377	Lbs. Beef	100	37,700
	Other Land 5/	2,800			
	Woodland	7,900			
	Total	35,900 6/			

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 a nd 6.
3/ Several other small grains will be used, but all lumped together with wheat as base.
4/ This lespedeza acreage was over-seeded in wheat.
5/ Farmsteads, farm roads, waste and non-agricultural.
6/ Does not include 400 acres of water area.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE III B
(Zone for Drainage and Flood Control Calculations)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS: FUTURE CONDITIONS WITHOUT PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre	Production Total	Value of Production Per Unit	Value of Production Total	Cost of Production Per Acre	Cost of Production Total	Net Return
						Dollars	Dollars	Dollars	Dollars	Dollars
				2/				3/		
All	Open Land	30,540								
	Crops	27,486								
	Cotton Lint	5,807	Lbs.	274.3	1,592,960	0.24	382,310	79.95	464,294	6,186
	Cotton Seed	(5,807)	Ton		1,433.67	61.50	88,170			
	Corn	6,751	Bushel	28.5	192,439	1.45	279,038	25.26	170,545	108,493
	Soybeans	11,982	Bushel	18.8	225,484	2.30	518,613	25.12	301,040	217,573
	Sm. Gr. (Wheat) 4/	2,558	Bushel	17.7	45,251	1.60	72,401	20.06	51,311	21,090
	Lespedeza 5/	(478)	Lbs.Beef	109.2	52,175	0.209	10,905	15.03	7,184	3,721
	Perm. Pasture	388	Lbs.Beef	125	48,500	0.209	10,137	17.39	6,747	3,390
	Other Land 6/	3,054								
	Woodland	4,021				12.16	48,896	6.25	25,132	23,764
Total		34,561 9/					1,410,470		1,026,253	384,217 7/ 398,682 8/

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ This lespedeza acreage was over-seeded in wheat.
6/ Farmsteads, farm roads, waste and non-agricultural.
7/ Includes negative net return.
8/ Adjusted to eliminate negative net return.
9/ Does not include 1339 acres of woodland to remain in woodland; and 400 acres water area.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE IV B
(Zone for Drainage and Flood Control Calculations)
COMPUTATION OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COSTS AND NET RETURNS: FUTURE CONDITIONS WITH PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Production Per Acre	Production Total	Value of Production Per Unit	Value of Production Total	Cost of Production Per Acre	Cost of Production Total	Net Return
						Dollars	Dollars	Dollars	Dollars	Dollars
				2/				3/		
All	Open Land	34,561								
	Crops	31,105								
	Cotton Lint	6,859	Lbs.	410.4	2,815,019	0.24	675,605	107.54	737,623	93,794
	Cotton Seed	(6,859)	Ton		2,533.52	61.50	155,812			
	Corn	7,380	Bushel	50.9	375,934	1.45	545,105	40.29	297,351	247,754
	Soybeans	10,401	Bushel	28.9	300,594	2.30	691,367	32.14	334,270	357,097
	Sm. Gr. (Wheat) 4/	3,191	Bushel	23.2	74,134	1.60	118,615	25.18	80,361	38,254
	Lespedeza 5/	(1,009)	Lbs.Beef	202.4	204,210	0.209	42,680	25.03	25,254	17,426
	Hay & Pasture6/	1,590	Lbs.Beef	200.1	319,126	0.209	66,698	29.15	46,351	20,347
	Perm. Pasture	1,684	Lbs.Beef	200.0	336,610	0.209	70,352	29.07	48,958	21,394
	Other Land 7/	3,456								
	Total	34,561	8/				2,366,234		1,570,168	796,066

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Several other small grains will be used, but all lumped together with wheat as base.
5/ This lespedeza acreage was over-seeded in wheat.
6/ This item considered cropland in rotation.
7/ Farmsteads, farm roads, waste and non-agricultural.
8/ Does not include 1339 acres of woodland to remain in woodland and 400 acres water area.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE II C
(Zone of No Project Benefit)
COMPUTATION OF AGRICULTURAL PRODUCTION
EXISTING CONDITIONS

Soil Unit	Land Use and Crop Distribution	Acres 1/	Production Unit	Per Acre 2/	Total
All	Open Land	2,160			
	Crops	1,944			
	Cotton Lint	234	Lbs.	200	46,800
	Cotton Seed	(234)	Ton		42.12
	Corn	925	Bushel	23.1	21,380
	Soybeans	785	Bushel	16.5	12,970
	Other Land 3/	216			
	Woodland	6,520			
	Total	8,680 4/			

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Farmsteads, farm roads, waste and non-agricultural.
4/ Does not include 660 acres of water area.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

SUMMARY - TABLE III C
(Zone of No Project Benefit)
COMPUTATIONS OF AGRICULTURAL PRODUCTION, VALUE OF PRODUCTION, PRODUCTION COST AND NET RETURNS: FUTURE CONDITIONS WITHOUT PROJECT (Based on projected prices)

Soil Unit	Land Use and Crop Distribution	Acres 1	Production Unit	Production Per Acre	Production Total	Value of Production Per Unit	Value of Production Total	Cost of Production Per Acre	Cost of Production Total	Net Return
						Dollars	Dollars	Dollars	Dollars	Dollars
				2/				3/		
All	Open Land	3,790								
	Crops	3,411								
	Cotton Lint	454	Lbs.	220	99,880	0.24	23,971	69.16	31,399	-1,900
	Cotton Seed	(454)	Ton		89.89	61.50	5,528			
	Corn	1,658	Bushel	24.4	40,508	1.45	58,737	22.63	37,525	21,212
	Soybeans	1,299	Bushel	17.9	23,278	2.30	53,539	24.45	31,763	21,776
	Other Land 4/	379								
	Woodland	4,890				14.18	69,340	7.64	37,360	31,980
	Total	8,680 7/					211,115		138,047	73,068 5/ 74,968 6/

1/ Parenthetical amounts are duplicated acreages.
2/ Obtained from columns 3 and 6.
3/ Obtained from columns 3 and 10; rounded off to nearest cent.
4/ Farmsteads, farm roads, waste and non-agricultural.
5/ Includes negative net return.
6/ Adjusted to eliminate negative net returns.
7/ Does not include 660 acres of water area.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

TABLE V

REACH SUMMARY BY SOIL MAPPING UNITS

Soil Unit	Acres	Production Future Without Project: Gross Value	Cost	Net Value	Production Future With Project: Gross Value	Cost	Net Value	Difference In Net Value
				ZONE A				
1	8,628	321,284	260,128	70,051 1/	570,826	371,575	199,251	129,200
4	1,640	124,185	94,307	29,878	173,437	126,818	46,619	16,741
6	3,417	168,958	124,780	44,178	256,305	170,400	85,905	41,727
Total	13,685 2/	614,427	479,215	144,107 1/	1,000,568	668,793	331,775	187,668
				ZONES B & C				
1	30,877	956,417	701,594	271,188 1/	1,640,779	1,073,281	569,398	298,210
2	127	5,768	3,158	2,610	7,657	3,686	3,971	1,361
3	836	40,385	27,732	12,653	62,458	40,657	21,801	9,148
4	744	55,150	38,874	16,276	68,132	47,916	20,216	3,940
6	9,512	460,986	323,597	137,389	697,373	472,121	225,252	87,863
11	1,145	102,879	69,345	33,534	100,950	70,554	30,396	- 3,138 4/
Total	43,241 3/	1,621,585	1,164,300	473,650 1/	2,577,349	1,708,215	871,034	397,384
GRAND TOTAL	56,926	2,236,012	1,643,515	617,757 1/	3,577,917	2,377,008	1,202,809	585,052

1/ Adjusted to eliminate negative net return.
2/ Does not include 17,328 acres not needing drainage; 189 acres of water; 800 acres of urban area; 1,521 acres of non-participation in farm drainage and 147 acres of woodland to remain in woodland.
3/ Does not include 1,339 acres of woodland to remain in woodland and 1,060 acres of water area.
4/ Negative amount due to predicted change in cropping pattern to less profitable crops (corn and soybean acreage to pasture.)

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

TABLE VI
LAND CONVERSION WITH PROJECT

Type of Conversion	Total Amount	Cost of Clearing	Cost of Smoothing	Total Cost
	Acres	Dollars	Dollars	Dollars
Per Acre				
W to GC 1/		55.00	15.00	70.00
Project				
W to GC	4,021	221,155	60,315	281,470
Total Project		221,155	60,315	281,470
Annual amortized value 2/				15,419
Total Annual Cost of Conversion				15,419

1/ W--Woodland; GC--General Dry-farmed crops
2/ Amortized at 5% for 50 years.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

TABLE VII

ANALYSIS OF FARM DRAINAGE SYSTEM COSTS

Soil Mapping Unit and Land Use		Area (Acres)	Total Cost Installation 1/	Annual Equivalent Cost 2/	Annual Maintenance Cost	Total Annual Cost
1	General Crops	24,683	262,158	25,256	30,249	55,505
1	Permanent Pasture	1,406	8,828	708	204	912
	Total	26,089 3/	270,986	25,964	30,453	56,417
2	General Crops	103	1,022	98	118	216
2	Permanent Pasture	-				
	Total	103 3/	1,022	98	118	216
3	General Crops	677	6,609	637	1,017	1,654
3	Permanent Pasture	-				
	Total	677 3/	6,609	637	1,017	1,654
4	General Crops	1,875	17,600	1,695	2,031	2,726
4	Permanent Pasture	74	338	27	8	35
	Total	1,949 3/	17,938	1,722	2,039	3,761
6	General Crops	9,592	93,647	9,022	14,407	23,429
6	Permanent Pasture	973	6,338	509	488	997
	Total	10,565 3/	99,985	9,531	14,895	24,426
GRAND TOTAL		39,383 3/	396,540	37,952	48,522	86,474

1/ Includes engineering and contingency.
2/ Farm drainage for cropland amortized at 5% over 15 years, and for pasture over 20 years. Maintenance costs are estimated to be high enough to produce this length of life.
3/ Not including 10% "other" for farmsteads, farm roads, waste and non-agricultural.

Basin - Mississippi River
Project - St. Johns Bayou
Sub-area - St. Johns Ditch
State - Missouri

TABLE IX

SUMMARY OF ANNUAL NET PRODUCTION RETURNS AND ASSOCIATED COSTS

Item	Total	Discounted Amount
	Dollars	Dollars
1. Net return with project	1,202,809	
2. Net return without project	617,757	
3. Gross benefit to project	585,052	463,771 1/
4. Farm Drainage Cost		
a. Installation Cost	37,952	
b. Maintenance Cost	48,522	
c. Total	86,474	68,548 1/
5. Total Conversion Cost	15,419	12,223 1/
TOTAL ASSOCIATED COSTS	101,893	80,771

1/ Discounted amounts reflects an estimated 10 year lag @ 5% (0.79270) to full benefit accrual.